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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/528,889	03/20/00	HULLENDER G	1204

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EXAMINER	
MILLER,M	

ART UNIT	PAPER NUMBER
2623	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary	Application No.	Applicant(s)	
	09/528,889	HULLENDER ET AL.	
	Examiner	Art Unit	
	Martin E Miller	2623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Status

1)☐ Responsive to communication(s) filed on *16 January 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

a)☐ All b)☐ Some * c)☐ None of the CERTIFIED copies of the priority documents have been:

1.☐ received.

2.☐ received in Application No. (Series Code / Serial Number) _____ .

3.☐ received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

Attachment(s)

14) ☒ Notice of References Cited (PTO-892)
15) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
16) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
17) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
18) ☐ Notice of Informal Patent Application (PTO-152)
19) ☐ Other: .

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1-18 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Although claims 1, 7 and 13, these claims do not specifically state that the secondary recognizers are CART trees, however, applicant provides no other embodiment other than a CART tree implementation of the secondary recognizers.

Claims 1, 3, 7, 9, 13, 16, and 18 are rejected for the following reasons. On page 12, of the specification applicant states: "At this time there is no standard set of questions, only questions based on the experience and observations of those skilled in the art". From this statement, one of ordinary skill in the art would not know to what degree of questioning or which questions to ask that would provide an optimal use of the CART tree. This would result in undue experimentation by one of ordinary skill in

the art to find the optimal method in which to implement the claimed invention. Further, the specification provides no information to the public on how the CART tree implementation can be improved upon and therefore advances technology because minimal information regarding the questions solved by the CART trees is provided.

Claims 2, 4-6, 8, 10-12, 14, 15 and 17 are rejected to due to their dependence upon rejected base claims.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> **The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.**

5. Claims 5, 6, and 11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As per claims 5 and 11, the recite the limitation of "applying questions to chirographs". Does the inventive device ask the chirograph questions? How does a chirograph answer a question? The Examiner understands that the secondary recognizers are decision trees that require certain criteria to be met in order for a decision to be made. The decision criteria are usually presented in the form of a question. However, this wording is indefinite and vague. The examiner suggests using "determining a plurality of distinguishing features from predetermined criteria" or similar.

Claim 6 is rejected for reciting that the question in claim 5 is measured to determine the quality of each question. This is indefinite and vague. How does the

recognizer determine the quality of the question? What is a quality question? What is the range for quality? Is there an objective quality standard?

Claim Rejections - 35 USC § 103

6. Claims 1, 2, 7, 8, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Crane et al., US 4718102.

Crane does not specifically state that he uses shape indexes or code points. However, applicant does not state with any specificity what a shape index entails. The specification does state that a code point is a more general shape index, which the examiner is interpreting as a code point being a subset of a shape index. Therefore giving shape index as broad an interpretation as reasonable, the Examiner believes that the stroke shape and sequence of Crane is analogous to the shape index of applicant. Further, the code points of the instant invention are equivalent to any of the following: the interstroke distance, intrastroke distance, contour length, intercepts or level of stroke complexity data of Crane (col.6, ll. 12-20, col. 20, ll. 61-63). Also, Crane does not specifically state that the entire chirograph is presented to the disambiguation phase of his invention. However, he does teach that the disambiguation phase uses different parts of the chirograph so it is obvious that the entire chirograph is provided and multiple disambiguation routines operate on the chirograph to achieve a recognition result (col. 20, ll. 63-68).

providing a primary recognizer (algorithmic part, abstract, col. 4, ll. 7-34, col. 20, ll. 28-54) for converting chirographs to shape indexes;

providing a plurality of secondary recognizer to convert chirographs into code points ("contour length, intercepts or level of stroke complexity", col. 20, ll. 61-63), and associating the secondary recognizers with at least some of the shape indexes ("confusion set", col. 20, ll. 55-57), each secondary recognizer capable of overriding a shape index provided by the primary recognizer;

receiving a chirograph (Figs. 1, 2A, 2B, and col. 20, ll. 27-28).

providing a chirograph to a primary recognizer and receiving a code point (col. 20, ll. 28-54).

determining whether one of the secondary recognizers is associated with the shape index ("every disambiguation routine associated with at least one entry representative of the character", col. 20, ll. 63-65, and "corresponding disambiguation routines", col. 20, ll. 57-58), and if so, selecting that secondary recognizer as a selected secondary recognizer; and

passing the chirograph to the selected recognizer and returning a code point from the secondary recognizer (col. 20, ll. 63-68, col. 21, ll. 17-18).

In applicant's arguments to the rejection in the previous office action, the applicant implied that the overriding limitation of the instant invention meant that any type of recognition result could be returned by the secondary recognizer, whether it was associated with the shape index provided by the primary recognizer. Using an example

to clarify, if the primary recognizer provided a shape index for the letter "A", the secondary recognizer would be able to return a code point for the letter "R". However, the plain meaning of the word "overriding" does not include such a broad definition. Using the plain meaning of the word it means a "veto" of the presented shape index not a substitution or completely new recognition result.

It would have been obvious to one of ordinary skill in the art to use different metrics (stroke length, number of strokes, interstroke distance, etc.) to measure the shape of an inputted handwritten stroke that convey similar information as Crane's stroke data which would allow for flexibility in writing styles and for customization of the recognition process. Further one of ordinary skill would be motivated to use the features of Crane because he solves the same problem as the instant invention and in the same general manner.

As per claim 7, it recites substantially the same limitations as claim 1 above except only broader and analogous remarks apply. Claim 7 does have one different limitation that requires further explanation. It recites that the "recognition result is independents of the shape index". Crane teaches that the shape index is only used to identify the confusion set. The disambiguation phase uses other features to determine the recognition result, so the recognition is independent of the shape index.

As per claim 13, it recites substantially the same limitations as claim 1 above except only broader and analogous remarks apply. Claim 13 does have one different limitation that requires further explanation. It recites that the use of an "interface

configured to receive a chirograph", Crane teaches an interface (see figs. 1 elements 38 and 12, 2A elements 40 and 42 and 2B, elements 43-45).

As per claims 2, 8, and 14, they recite identical limitations and, therefore, the following remarks apply to each.

Crane teaches: shape index comprises a code point. Crane teaches that the stroke distance is used to determine the stroke template and label that is to be applied to the input stroke (col. 17, ll. 18-61). He goes on to teach that stroke distance is used as a criteria of the secondary recognizers (col. 20, ll. 55-65)

As per claim 7, Crane teaches:

receiving a chirograph (figs. 1, 2A, 2B, col. 9, ll. 4-11, col. 20, ll. 27-28);

providing the chirograph to a primary recognizer ("algorithmic part", abstract, col. 4, ll. 7-34) to make a first determination as to a shape index (strokes are used to match a dictionary that corresponds to the chirograph);

selecting a secondary recognizer based on the shape index (non-algorithmic part, based on dictionary entries being determined to be representative, col. 20, ll. 14-21)

providing the chirograph to the secondary recognizer ("each designated entry", col. 57-68) the secondary recognizer determining a recognition result independent of the shape index provided by the primary recognizer (Crane does not use the shape index of the primary recognizer to perform his recognition, he uses information such as contour length, intercepts or level of stroke complexity, col. 20, ll. 61-63).

returning the recognition result from the secondary recognizer (col. 21, ll. 17-18).

As per claim 15, Crane teaches:

wherein the shape index comprises a single code point that differs from the returned code point. The stroke data of Crane is used to make a determination of the confusion set (col. 20, ll. 27-55). Once the confusion set is determined based upon stroke data, the entries of the confusion set are presented to the disambiguation phase which uses different measurements from stroke data to make a final determination. (col. 20, ll. 55-68) Thus the code point returned is different.

As per claims 12, 14 and 17, they recite generally the same limitation as claim 15 except more broadly and analogous remarks apply.

7. Claims 3, 9, 16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Crane as applied to claims 1, 7 and 13 above, and further in view of Guo et al. (Guo), "Classification trees with neural network feature extraction", Proceedings IEEE Computer Society Conference on Computer Vision and Pattern Recognition, June 1992.

As per claim 18, Crane teaches:

receiving a chirograph (col. 12, lines 50-51, col. 20, ll. 27-28).

providing the chirograph to a primary recognizer and receiving recognition information therefrom a primary recognizer for converting chirographs ("algorithmic part", abstract, col. 4, ll. 7-34) to code points.

Crane teaches that the disambiguation or non-algorithmic phase is only used when a confusion set is created (col. 11, ll. 27-32, col. 20, ll. 55-57). The corresponding value indicative of a CART could as easily be the value designating the entry in the confusion set (col. 20, l. 57). Crane does not teach the use of a CART tree. However, Guo teaches that a CART algorithm can be used for handwritten character recognition.

Crane teaches that the disambiguation routine depends to a large extent on human judgment derived from actual experience in differentiating members of the confusion set. The examiner is relying upon Guo to provide this human judgment through the use of CART trees. As Guo teaches, Cart trees are used to solve difficult pattern recognition problems with complex decision or human judgment boundaries (col. 2, second paragraph, p. 183. Guo teaches that a decision rule is associated with a tree col. 1, second paragraph, p. 184

Crane teaches the structure of the following claims and Guo teaches the use of a CART tree:

determining whether the recognition information corresponds to a recognized result or has a value indicative of a CART tree being associated therewith;

if the recognition information corresponds to a recognized result, and if the recognition information has the value indicative of the CART tree being associated therewith, providing chirograph information to the CART tree and returning a recognition result therefrom, the recognition being independent of the value indicative of the CART tree.

With regard to the limitation "the recognition being independent of the value indicative of the CART tree", the disambiguation routines of Crane and the CART trees of Guo both arrive at the recognition result without use the indicator value in any way. Therefore, the recognition is independent of the indicator value and both Crane and Guo read on the limitation

It would have been obvious to one of ordinary skill in the art at the time of the invention to integrate methodology of the CART algorithm with respect to handwriting as taught by Guo as a result of the optimization of the splitting criterion and the use of the Gini criterion to better emulate the human judgment elements of the disambiguation phase of Crane in order to make the system of Crane more efficient and optimize his recognition classification. Obviously the CART algorithm with respect to handwriting recognition must be an effective method since Guo is using the CART algorithm as his baseline to provide validity to his experimentation.

As per claims 3, 9, and 16, they simply recite the use of a CART tree as a secondary recognizer and the remarks in rejecting claim 18 above apply.

As per claim 4 and 10, Guo teaches:

training the secondary recognizers by providing a first training set comprising a plurality of chirographs and actual code points for each chirograph (p. 185, sect. 3.1, second paragraph). Guo states that the pattern vectors (actual code points) and their class labels (chirograph) are at a given node. Further in section 4.2 he states that the handwritten character is encoded into pattern vectors.

As per claims 5 and 11, Guo teaches:

wherein the secondary recognizers further comprises applying a plurality of questions to the chirographs. Guo teaches that CART trees are grown by recursively finding splitting rules until it cannot be split further (p. 184, sect. 2.1 TREE GROWING. He further teaches in his introduction section, p. 183, that trees classify an input pattern through a chain of decisions. Typically decisions when flow charted are presented in the form of a question (e.g., Does value x exceed threshold b?).

As per claim 6, Guo teaches:

wherein the secondary recognizers further comprises determining a question ordering by measuring the quality of each question. (p. 185, sect. 3.1 TREE GROWING, last paragraph of col. 1 and first part of col. 2.) Guo teaches that two different criteria are optimized to find a "good split", it is obvious in the use of CART trees that a quality question would result in a "good split".

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following U.S. patents pertain to pattern recognition, in particular character recognition: 5742702 to Oki, 5325445 to Herbert, 5077805 to Tan, which teaches first and second recognizers with respect to MICR characters and may suggest other types of characters, and 4561105 to Crane et al.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin E Miller whose telephone number is 703-306-9134. The examiner can normally be reached on flex.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on 730-308-6604. The fax phone numbers for the organization where this application or proceeding is assigned are 703-306-5406 for regular communications and 703-306-5406 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3800.

mem
April 4, 2001

AMELIA M. AU
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